Mapping the Geography of Data in Central Asia: *A View From Within*

Louis Pétiniaud

Kevin Limonier
Antonin Rosa-Martin
Loqman Salamatian

GE⊙DE

RIPE NCC
RIPE NETWORK COORDINATION CENTRE

IFG
Institut Français de Géopolitique

Mapping the (geography of the) Internet at three different levels

- Research Project carried out by GEODE reseachers

- Support from RIPE Project Funding

- **Broad objectives:**
  - Mapping the Internet of Central Asia at 3 different levels
  - Better understand the geopolitics behind the connectivity architecture

  - Methodological question: What gaps can we fill by going on the field?
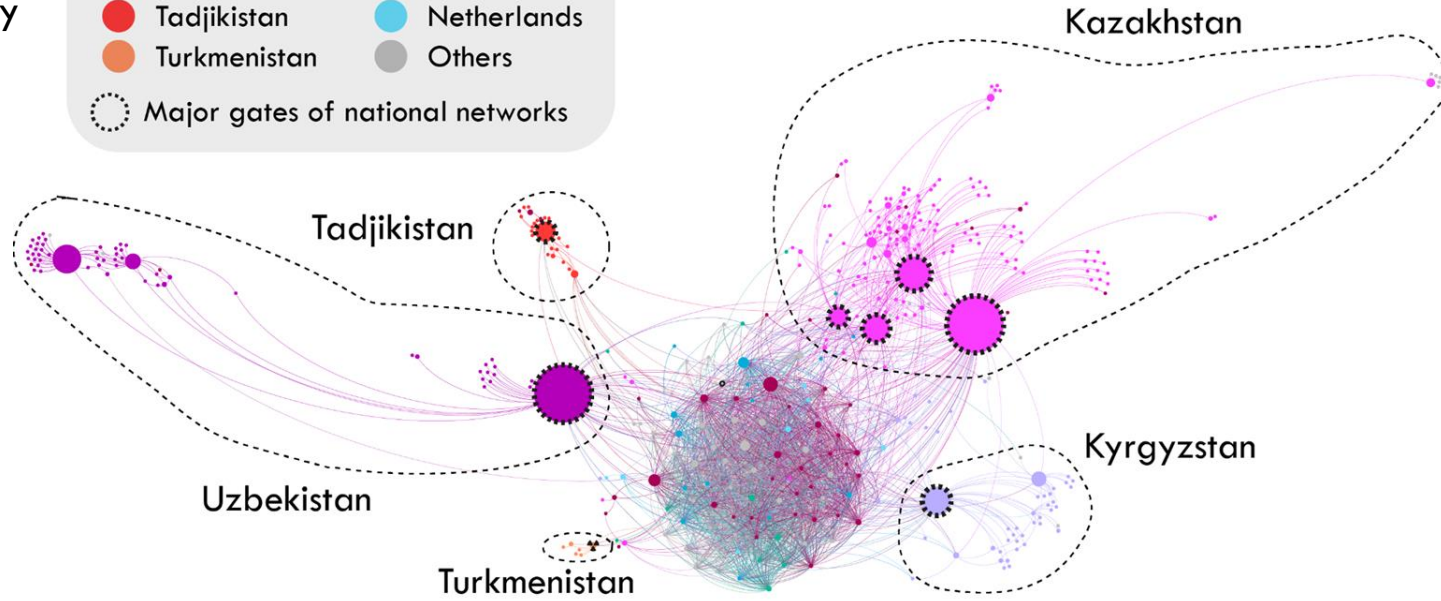   - The choice of an "simple" case study: Central Asia/Kyrgyzstan

Mapping physical infrastructures: possible with caveats

L'espace centrasiatique: un enclavement numérique
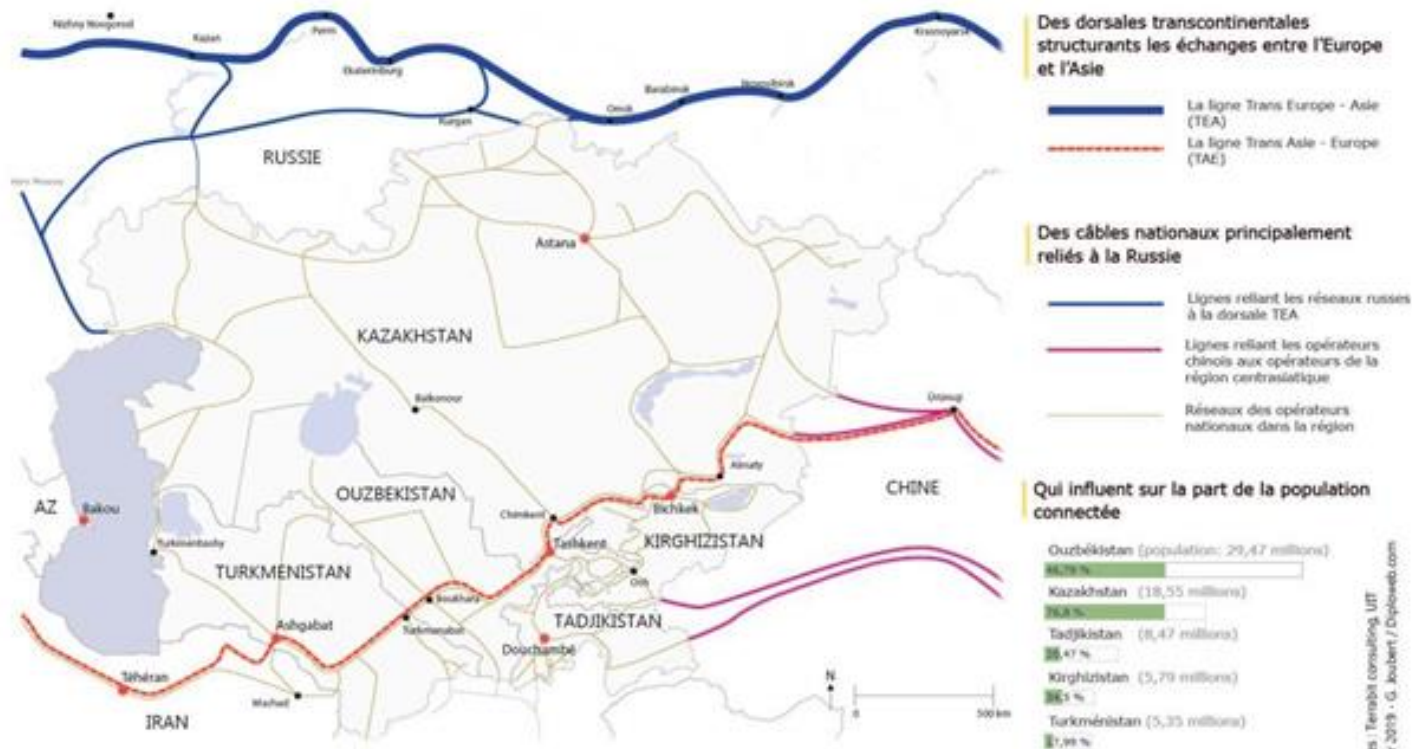
Mapping connectivity with BGP feeds

- Relative centralization of networks
- Very limited intra-regional connectivity

The connectivity of Kyrgyzstan

- Relative centralization
- Some dependencies identifiable (RU-KZ)

- Limited view
  - BGP feeds are incomplete
  - Data paths cannot be inferred

Mapping data with the Internet geographer's best friend

- Geolocated by design
- Can be leveraged to augment our knowledge of the geography of connectivity

Mapping latencies between Kyrgyzstan and its neighbours: more or less coherent patterns

Problem: Kyrgyzstan is a Ripe Atlas Far East

Fieldwork in Kyrgyzstan

Main goals:

- Understanding connectivity through interviews with local stakeholders (Providers, IXPs, government)

- Create on-site measurements from remote connected places to improve granularity

Interviewing local stakeholders to understand the architecture of connectivity

- Lack of a shared understanding of the region's connectivity
  - Southern IXPs
  - Connectivity with neighboring countries
  - No regional coordination/cooperation or even contacts

Interviewing local stakeholders to understand the architecture of connectivity

- A political environment with specific views on the network: "что такое цифровой суверенитет?"
  - Strong dependency on Kazakh and Russian networks
  - Redundancy and efficiency of networks are the responsibility of private operators
- The limited paradigm shift of the Russian invasion of Ukraine: how to escape structural dependencies?
  - Dependency to Russia as an "inescapable" fact
  - Some projects welcome : Turktelecom / Chinese infrastructures?
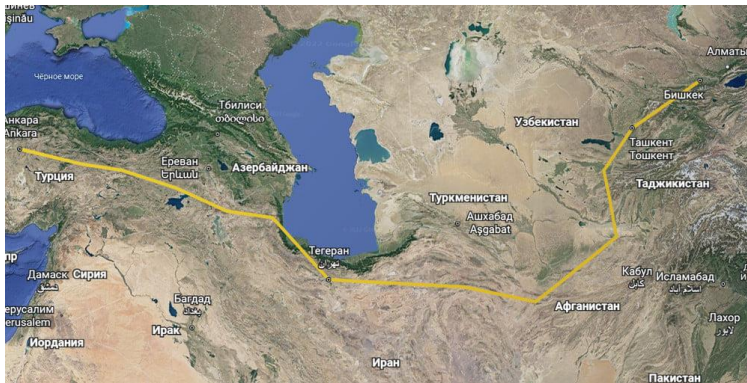
Interviewing local stakeholders to understand the architecture of connectivity

- Improving cooperation with RIPE: potential obstacles and overcoming them
    - Lack of interest
    - Lack of competent personnel
    - Overall lack of certainty over the cost/benefit ratio

Creating "local" measurements

A vizualisation platform fit for Geopolitics : Amethyst

OPEN OPTIONS

RESET

87.245.233.13
ASN9002
RETN-AS

United Kingdom
RETN Limited
45824 addresses announced
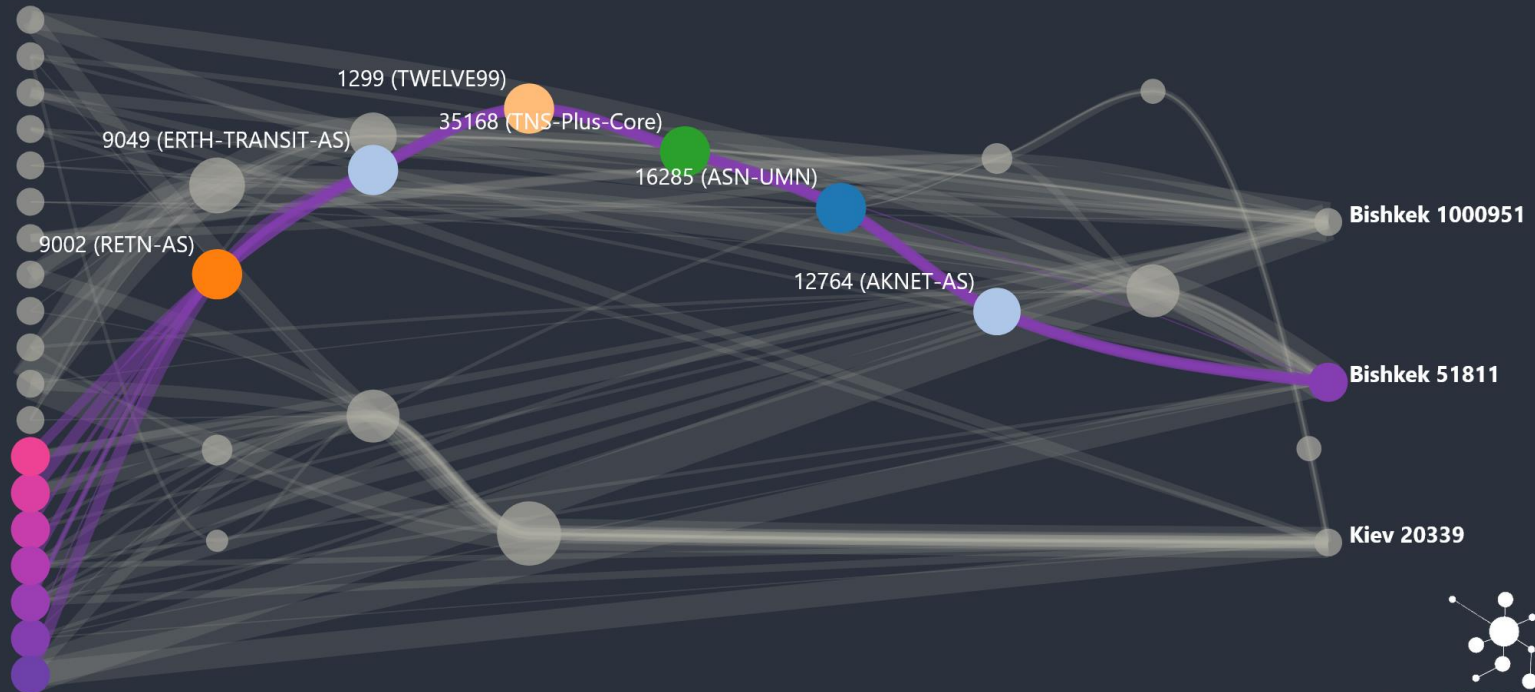Rank 13

AS cone: 7928 AS
91800184 addresses
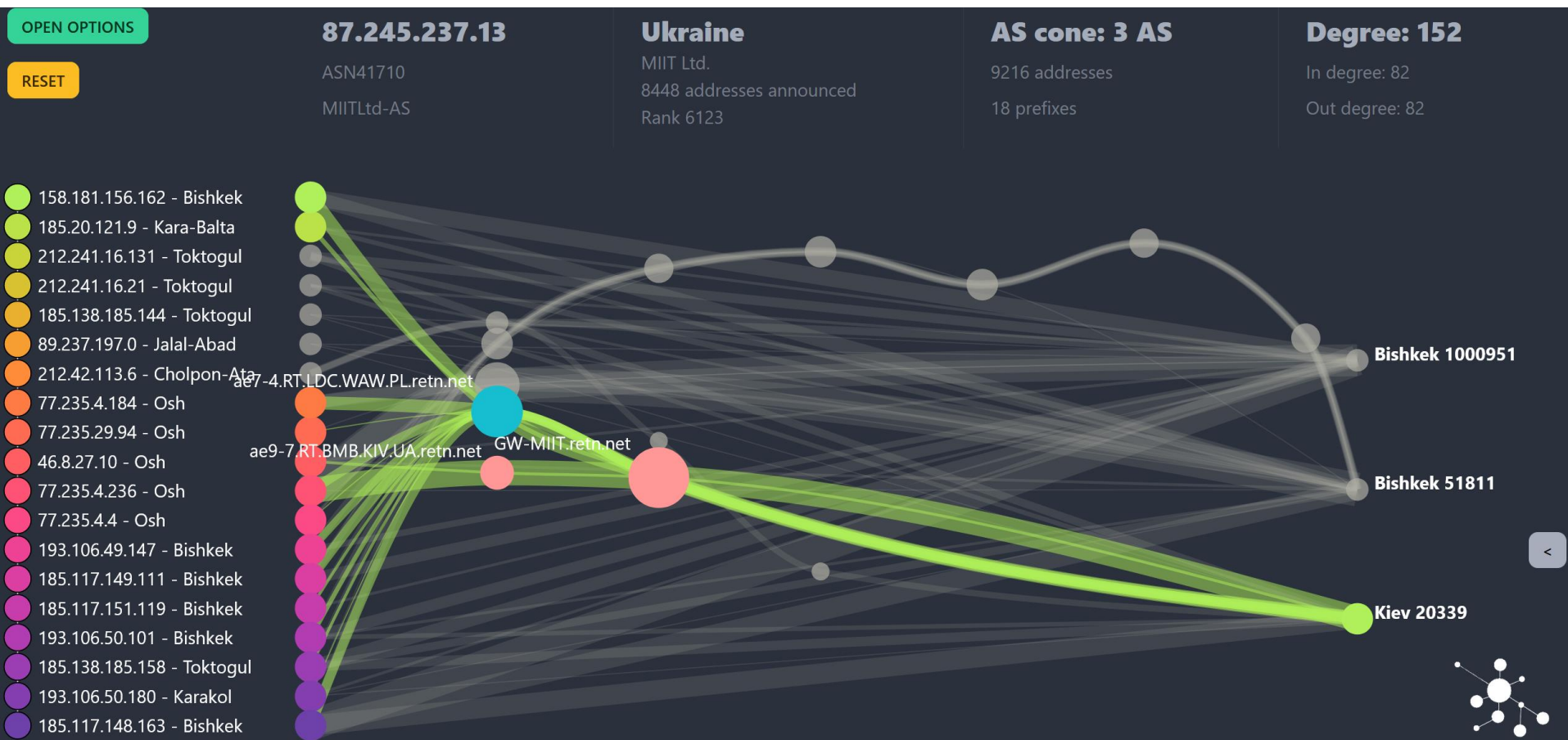106301 prefixes

Degree: 68
In degree: 40
Out degree: 40

- 158.181.156.162 - Bishkek
- 185.20.121.9 - Kara-Balta
- 212.241.16.131 - Toktogul
- 212.241.16.21 - Toktogul
- 185.138.185.144 - Toktogul
- 89.237.197.0 - Jalal-Abad
- 212.42.113.6 - Cholpon-Ata
- 77.235.4.184 - Osh
- 77.235.29.94 - Osh
- 46.8.27.10 - Osh
- 77.235.4.236 - Osh
- 77.235.4.4 - Osh
- 193.106.49.147 - Bishkek
- 185.117.149.111 - Bishkek
- 185.117.151.119 - Bishkek
- 193.106.50.101 - Bishkek
- 185.138.185.158 - Toktogul
- 193.106.50.180 - Karakol
- 185.117.148.163 - Bishkek

1299 (TWELVE99)
35168 (TNS-Plus-Core)
9049 (ERTH-TRANSIT-AS)
16285 (ASN-UMN)
9002 (RETN-AS)
12764 (AKNET-AS)

Bishkek 1000951
Bishkek 51811
Kiev 20339

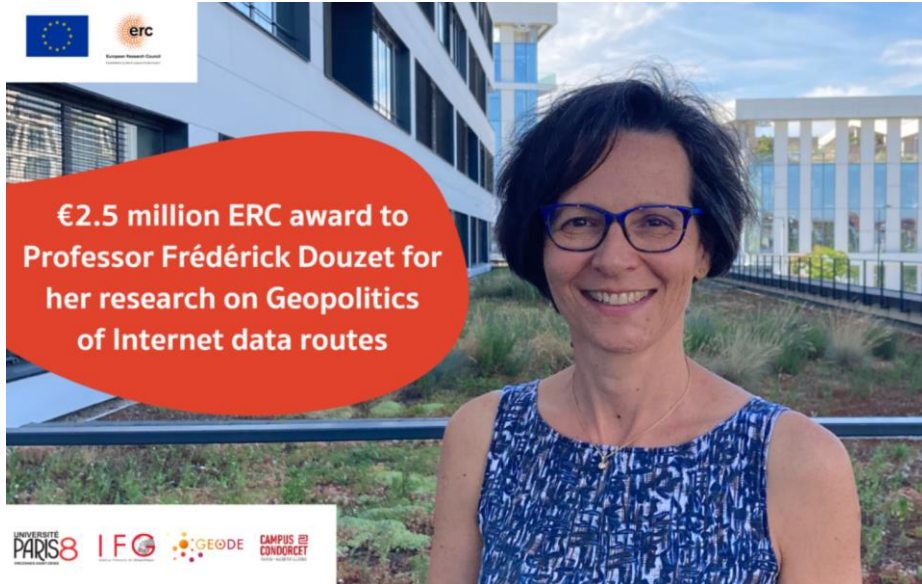# A vizualisation platform fit for Geopolitics : Amethyst

Potential for improvements and suggestions from WG?

- **Ripe Atlas dissemination:**
- How to increase the spread of RIPE Atlas probes, including in strategic areas
- Are "moving" probes efficient tools for other communities?

- **Facilitate the manipulation of measurements data**
- Work in progress: EasymapIT
- Geolocation data: how to prioritize the most reliable one?
- Develop new ideas for data vizualisation

- **On the replicability and reliability of fieldwork as a source of data: discussion is open**
- 2nd Fieldwork in Ukraine (February 2023) confirms the relevance for assessing the geopolitical causes and consequences of connectivity + geographical properties of the network
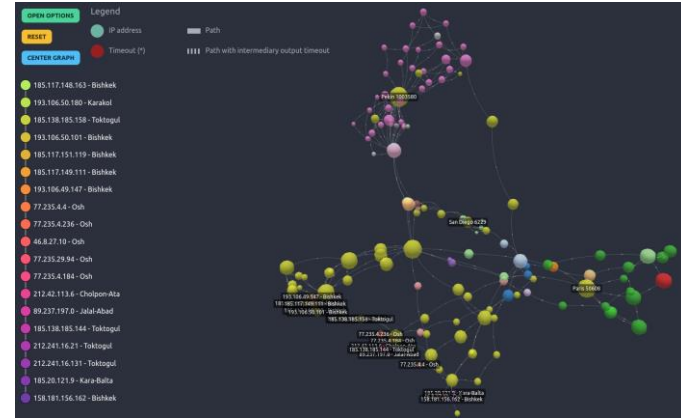
Future steps

- Other fieldworks: Ukraine, Canada, Pakistan, French Guyana…
- Increase cooperation with researchers from CS, STS, Mathematics
- 5 years project starting now

€2.5 million ERC award to Professor Frédérick Douzet for her research on Geopolitics of Internet data routes

Thank you !

l.petiniaud@gmail.com

https://twitter.com/LPetiniaud

RIPE Labs articles
- 1/ First article for RIPE Labs on *The Geopolitics of Routing* (2019): https://labs.ripe.net/author/louis_petiniaud/geopolitics-of-routing/
- 2/ The Central Asia fieldwork: https://labs.ripe.net/author/louis_petiniaud/the-human-factor-in-the-geopolitics-of-the-internet/
- 3/ Coming soon: Description and updates of the Amethyst platform
- 4/ The Ukrainian case: someday